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EXAMINER	
PALABRICA, RICARDO J	

ART UNIT	PAPER NUMBER
3641	

DATE MAILED: 10/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/964,624	Applicant(s) HEMMI ET AL.	
	Examiner Rick Palabrica	Art Unit 3641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 August 2003 and 14 July 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) *5-13* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Applicant's amendment under 37 CFR 1.114 (Paper No. 18), which directly revises claim 1, is acknowledged. This amendment also summarizes the arguments in the Amendment After Final (Paper No. 14), and highlights features of the invention that the applicant claims to be patently distinct from the applied art in the Office Action dated 2/13/03.

2. Applicant's arguments in both papers have been fully considered but they are not persuasive because the features upon which the applicant relies are not recited in rejected claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Additionally, if said unrecited features are considered by the applicant to be critical to his invention, then such omission would amount to a gap between the essential elements. In this case, the claims would be incomplete and would be rejected under 35 U.S.C. 112, second paragraph. See MPEP § 2172.01.

Applicant alleges in Paper No. 18 that one distinctive feature of the claimed invention is, "the amount of iron carried into the nuclear reactor and corrosively eluted from the structural material within nuclear reactor into reactor water is made to be at least twice as much as the total amount of nickel carried into the nuclear reactor **and** the amount of nickel generated in the nuclear reactor" (see page 6 of Remarks section).

Emphasis added. The Examiner disagrees because the amended claim 1 does not adjust the amount of iron based on both the sources of nickel indicated above but rather on **any one** of the two sources.

Applicant also alleges in both Paper No. 18 and 14 that a key feature that differentiates the claimed invention from the applied art is that to achieve the requirement of Fe/Ni ≥ 2, the following conditions must be met:

a) the amount of nickel carried from the water supply to the nuclear reactor must not be greater than 1/ 4.4, when the amount of iron carried from the water supply is up to 0.10 ppb; and

b) the amount of nickel carried from the water supply to the nuclear reactor must not be greater than 1/ 4.4, and the amount of nickel generated from the fuel springs must not be greater that 1/2, when the amount of iron carried from the water supply is up to 0.04 ppb. (See, for example, pages 6 and 7 in Paper No. 18, and pages 7, 9, and 10 in Paper No. 14).

The Examiner notes that neither one of limitations a) or b) above is recited is the claims.

3. Applicant also alleges in Paper No. 14 that the claimed method is different from those disclosed in the prior art applied in the rejection of claims, i.e., Nagase et al. '202 and Nishino et al. because they are designed for a different purpose, i.e., for reducing the concentration of radioactive Co-60 and Co-58 in the reactor water (see pages 7-9 of Paper No. 14).

The Examiner disagrees because the alleged different purpose of the applied art is immaterial for as long as the reference discloses the same steps in the claimed method, as it has been shown in the previous Office Action. Also, the claims recite the inclusive, open-ended transitional term "comprising", which is synonymous with "including", "containing", or "characterized by", and does not exclude additional, unrecited elements. See, e.g., MPEP 2111.03 and *Genentech, Inc, v. Chiron Corp.,* 112 F.3d 495, 501, 42 USPQ2d 1608, 1613 (Fed. Cir. 1997) ("Comprising" is a term of art used in claim language which means that the named elements are essential, but other elements may be added and still form a construct within the scope of the claim). Thus, any other additional steps that Nagase et al. '202 or Nishino et al. may include in their methods would not make them patently different from the claimed invention.

4. Applicant also traversed the use of the secondary references, i.e., Honda et al. and Midorikawa et al., in modifying the primary references, on the grounds that the secondary references do not suggest or teach the steps in the claims (see, for example, pages 11 and 12 of paper No. 14). The examiner disagrees because these secondary references were shown to be in the same field of endeavor and have appropriate teachings for further improving the methods disclosed in the primary references. The resulting combinations of the primary and secondary references were then shown in the previous Office Action to disclose the method steps in the claimed invention.

5. Applicant specifically traversed the use of Honda et al. because the "timing of injecting zinc and the timing of exhibiting the aimed effect" is different from the claimed process" (see page 12 of Paper no. 14). The examiner disagrees because these features regarding timing are not disclosed in the claims.

6. It is unclear to the Examiner why the applicant is traversing references that were not even applied to the rejection of claims in the previous Office Action, i.e., Niedrach, Hettiarachi, and Lin et al. (e.g., see pages 11, 13 and 14 in Paper No. 14).

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-4 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Amended claim 1 recites the limitation, "applying an atmospheric oxidation treatment to nickel base alloy material which is used in a feed water heater and a fuel assembly of a nuclear reactor, so that a nickel concentration in a reactor water is

maintained to be less than 0.2 ppb." Underlining provided. The term, "atmospheric oxidation" implies being exposed to air. However, there is neither an adequate description nor enabling disclosure as to how and in what manner said oxidation treatment could be performed when the feed water heater and fuel assembly are in the reactor. Note that the preamble states that the claimed method is "for controlling water quality in a nuclear reactor." This implies that the reactor is already completed or operational, and the cooling water quality is being controlled.

There is neither an adequate description nor enabling disclosure as to how and in what manner the cited nickel concentration in the reactor water can be maintained only by atmospheric oxidation treatment of the nickel base alloy materials in said reactor components. How about the nickel contribution from other components (e.g., pressure vessel), previous operating history of the reactor (e.g., power level), water chemistry method, etc., all of which can affect the total amount of nickel in the system. The Examiner notes that the applicant attempted to address a similar issue in Paper No. 14, but the arguments are not convincing.

8. Claims 1-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims vague and indefinite, and the metes and bounds thereof are undefined because of the reasons given in section 7 above.

Claim 2 recites the limitation "preliminary oxidation" in line 2. There is insufficient antecedent basis for this limitation in the claim. Also, the term, "preliminary" is relative, it can be given no definite meaning and accordingly they render the claim vague and indefinite, and the metes and bounds thereof are undefined.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Nagase et al. (U.S. 4,894,202) [hereinafter referred to as Nagase et al. (202) or Nishino et al. (U.S. 4,927,598), in view of Nagase et al. (U.S. 5,398,269) [hereinafter referred to as Nagase et al. (269)]. Either one of Nagase et al. (202) or Nishino et al. disclose the applicant's claims except for the specific concentration limit on iron in the reactor water and the preliminary oxidation treatment of nickel base material.

Nagase et al. (202) disclose a method for inhibiting radioactive substances eluting into the primary cooling water of a nuclear plant comprising the step of adjusting the Fe/Ni molar concentration ratio in the cooling water from about 2 to 10 (see Abstract and claim 1).

Nishino et al. disclose a method of reducing radioactivity of piping in a primary cooling water recirculation line and various apparatus and devices in a nuclear plant by converting nickel and/or cobalt into nickel ferrite and/or cobalt ferrite (see column 2, lines 13-18). They claim that said conversion can be effected by an Fe/Ni stoichiometric ratio of 2 (see column 4, lines 56-60 and Example 1 on column 5).

Nagase et al. (269) disclose a water quality method in a nuclear power plant that reduces the ^{60}Co ion concentration in the reactor water. They teach that the conventional method of reactor water control using Fe/Ni concentration ratio as control index is not enough because although it may maintain the ^{58}Co ion concentration at a low level, the ^{60}Co ion concentration possibly increases beyond an estimated level (see column 1, lines 33-41). To address this ^{60}Co problem, they teach a method of controlling iron concentration in the feed water below 0.1 ppb and below 0.05 ppb (see claims 3 and 4). One having ordinary skill in the art would have recognized the advantage of limiting the iron concentration in addition to controlling the Fe/Ni concentration ratio in the reactor water, i.e., reduced coolant radioactivity and lower potential exposure of plant personnel.

As to the limitation in claim 2 regarding an upper limit of 0.04 ppb for the iron concentration, note that Nagase et al. (269) disclose an iron concentration of "below 0.05 ppb" that anticipates the claimed iron concentration.

As to the limitation in the claims regarding iron and how it is carried into the system, the method disclosed by either one of Nagase et al. or Nishino et al. results in iron being inherently carried into the nuclear reactor and corrosively eluted from

structural material within the nuclear reactor into the reactor water, and such results cannot be prevented. Also, the control their method includes a means for removing iron from the reactor water (see Fig. 1 and column 4, lines 6+ in Nagase et al. (202) or Fig. 1, column 7, lines 32+ in Nagase et al. (269)).

As to the limitation in the claims regarding atmospheric oxidation treatment to the nickel based alloy material for the feed water heater and fuel assembly, the claims do not provide any parameters on said oxidation process. The nickel based materials used by either Nagase et al. (202) or Nishino et al. inherently undergo atmospheric oxidation because they are exposed to the atmosphere during manufacture and assembly to make the said components.

One having ordinary skill in the art would have recognized that all three references are in the same field of endeavor of reducing the radioactive contamination in the primary coolant circuit of a nuclear reactor. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of either one of Nagase et al. (202) or Nishino et al. by the teachings of Nagase et al. (269), to gain the advantages thereof (e.g., lower coolant radioactivity), in order to have a method of controlling water quality in a nuclear reactor comprising the steps of atmospheric oxidation of the nickel based alloys of the feed water heater and fuel assembly to have a nickel concentration in the reactor water of less than 0.2 ppb, and making the amount of iron at least twice the amount of nickel, and limiting the amount of iron up to 0.1 ppb and up to 0.04 ppb, in order to gain the advantages thereof, as this is

no more than the application of well known techniques of reactor water quality control and contamination reduction in the primary coolant circuit within the nuclear art.

10. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over either one of the Nagase et al. (202) - Nagase et al. (269) combination or Nishino et al. - Nagase et al. (269) combination, as applied to claims 1-3 above, and further in view of Honda et al. (U.S. 4,828,790). Either one of the Nagase et al. (202) - Nagase et al. (269) combination or the Nishino et al. - Nagase et al. (269) combination disclose the applicant's claims except for the addition of natural zinc.

Honda et al. disclose a method for inhibition of deposition of radioactive substances on nuclear power plant components contacting reactor-cooling water containing radioactive substances. Their method involves introducing polyvalent metal cations, including zinc ions, into the reactor cooling water in a concentration of 3 ppb to 1000 ppm (see claims 1 and 3, and column 4, lines 34-39). Their method comprises adding a mixture of metal ions containing zinc into the primary cooling system, wherein the zinc ion concentration is limited to a maximum of 1 ppb (see claims 1 and 8). One having ordinary skill in the art would have recognized that introducing zinc in the reactor water provides the advantage reducing potential doses to cognizant plant personnel by preventing radioactive material deposition on certain primary coolant structures, systems and components.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of either one of the Nagase et al.

(202) - Nagase et al. (269) combination or the Nishino et al. - Nagase et al. (269) combination, by the teaching of either Honda et al., in order to have a method of controlling water quality in a nuclear reactor that further comprises introducing natural zinc into the reactor water to limit a zinc ion concentration value to up to 5 ppb, in order to gain the advantages thereof (i.e., personnel dose reduction), as this is no more than the application of well known techniques within the nuclear art.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rick Palabrica whose telephone number is 703-306-5756. The examiner can normally be reached on 7:00-4:30, Mon-Fri; 1st Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Carone can be reached on 703-306-4198. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1113.

RJP
October 2, 2003

SUPERVISORY PATENT EXAMINER